

Lab 2 - PSTN Routing, Dial Peers and SIP Gateways

CCNA Voice Lab 2

PSTN Routing, Dial Peers and SIP Gateways

Lab Objective:

The objective of this lab exercise is for you to learn and understand how implement PSTN routing and dial peers on Cisco IOS SIP gateways

Topic Description:

A dial-peer is associated with each call leg. The matching process for a dial peer will vary depending on whether it is an inbound dial peer, i.e. it is matching incoming calls, or an outbound dial peer, i.e. it is matching outgoing calls.

Lab Difficulty:

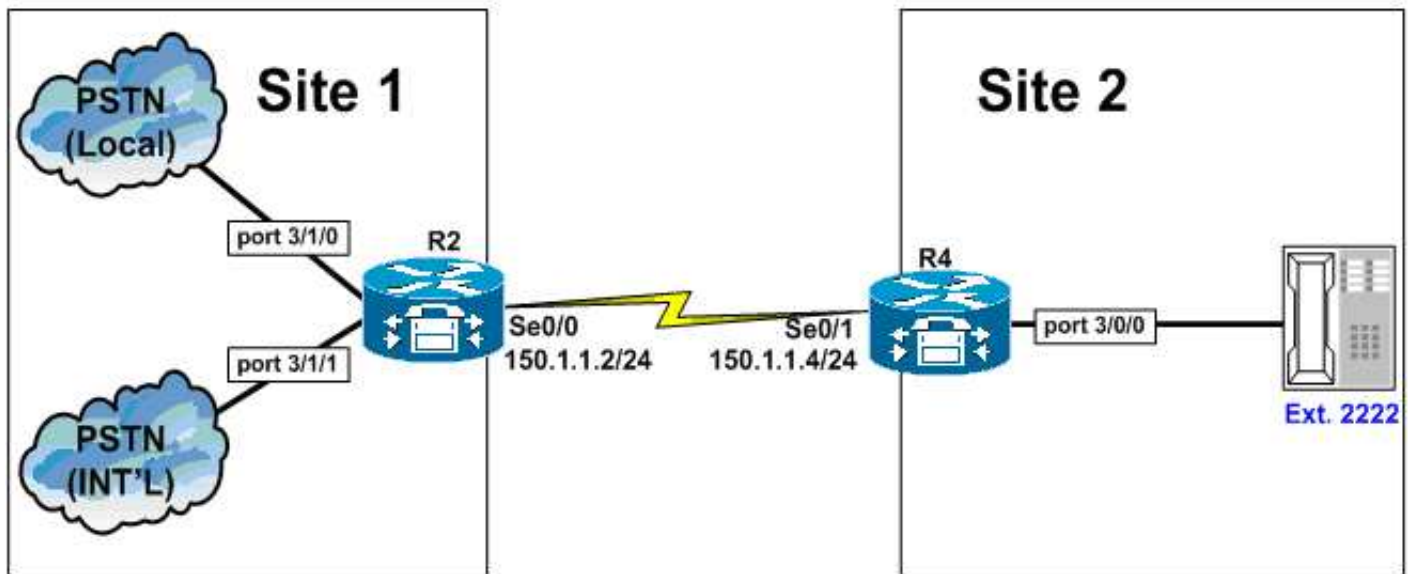
This lab has a difficulty rating of 6/10

Readiness Assessment:

When ready for your exam, you should be able to complete this lab in no more than 10 minutes

Lab Topology:

Please use the following topology to complete this lab exercise:



Lab 2 Configuration Tasks

Task 1:

Configure the hostnames and IP addresses on R2 and R4 as illustrated in the diagram. Configure R4 to provide clocking to R2. Configure the clock rate on R4 as 800Kbps

Task 2:

Configure the POTS dial peer on R4 for the extension specified in the diagram. You are permitted to use any dial peer numbers that you want to use

Task 3:

Configure a POTS dial peer on R2 for local and long distance PSTN access. This dial peer should be configured so that all local PSTN calls that begin with the number 91 and are followed by any 10 digits are sent forwarded via port 3/1/0. Ensure that 11 digits, i.e. 1 + the 10-digit number are forwarded to the PSTN. Use any dial peer number you want to use

Task 4:

Configure a POTS dial peer on R2 for international PSTN access. This dial peer should be configured so that all international PSTN calls that begin with the number 9011 and are followed by any number of digits are sent forwarded via port 3/1/1. Ensure that 011 plus the dialed digits are forwarded to the PSTN. Use any dial peer number you want to use

Task 5:

Configure a VoIP dial peer on R2 to for the extension on R4. You are permitted to use any dial peer numbers that you want to use. Use SIP as the signaling protocol

Task 6:

Configure a single VoIP dial peer on R4 for PSTN dial peers on R2. You are permitted to use any dial peer numbers that you want to use. Use SIP as the signaling protocol

Task 6:

Test and validate your configuration using the appropriate **show** and **debug** commands

Lab 2 Configuration and Verification

Task 1:

```
R2(config)#hostname R2
R2(config)#interface Serial0/0
R2(config-if)#description .Connected To R4 Serial 0/1.
R2(config-if)#ip address 150.1.1.2 255.255.255.0
```

```
R4(config)#hostname R4
R4(config)#interface Serial0/1
R4(config-if)#description .Connected To R2 Serial 0/0
R4(config-if)#ip address 150.1.1.4 255.255.255.0
R4(config-if)#clock rate 800000
```

Verify connectivity by performing a simple ping between the two routers

R2#**ping 150.1.1.4**

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.4, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

R4#**ping 150.1.1.2**

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 150.1.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/8 ms
```

Task 2:

```
R4(config)#dial-peer voice 1 pots
R4(config-dial-peer)#destination-pattern 2222
R4(config-dial-peer)#port 3/0/0
```

Task 3:

```
R2(config)#dial-peer voice 1 pots
R2(config-dial-peer)#destination-pattern 91.....
```

```
R2(config-dial-peer)#prefix 1  
R2(config-dial-peer)#port 3/1/0
```

An acceptable alternative dial peer configuration would be:

```
R2(config)#dial-peer voice 1 pots  
R2(config-dial-peer)#destination-pattern 91.....  
R2(config-dial-peer)# forward-digits 11  
R2(config-dial-peer)#port 3/1/0
```

Task 4:

```
R2(config)#dial-peer voice 2 pots  
R2(config-dial-peer)#destination-pattern 9011T  
R2(config-dial-peer)#prefix 011  
R2(config-dial-peer)#port 3/1/1
```

This POTS dial-peer can match on any string of digits starting with 9011, and all digits that follow the 9011 are played out voice-port 3/1/1. The prefix 011 is appended to the digits

Task 5:

```
R2(config)#dial-peer voice 3 voip  
R2(config-dial-peer)#destination-pattern 2222  
R2(config-dial-peer)#session target ipv4:150.1.1.4  
R2(config-dial-peer)#session protocol sipv2  
R2(config-dial-peer)#exit
```

Task 6:

```
R4(config)#dial-peer voice 2 voip  
R4(config-dial-peer)#destination-pattern 9T  
R4(config-dial-peer)#session target ipv4:150.1.1.2  
R4(config-dial-peer)#session protocol sipv2  
R4(config-dial-peer)#exit
```

NOTE: Keep in mind that there is no default digit stripping on VoIP dial peers

Task 7:

The first task is to use the **show dialplan number** command to verify correct configuration:

```
R2#show dialplan number 916785551234 | i Macro|Voice|Type|type|port  
Macro Exp.: 916785551234  
VoiceEncapPeer1  
    peer type = voice, information type = voice,  
    numbering Type = 'unknown'  
    type = pots, prefix = '1',  
    session-target = '', voice-port = '3/1/0',  
    supported-language = '  
R2#  
R2#show dialplan number 9011441234567890# | i Macro|Voice|Type|type|port  
Macro Exp.: 9011441234567890  
VoiceEncapPeer2  
    peer type = voice, information type = voice,  
    numbering Type = 'unknown'  
    type = pots, prefix = '011',  
    session-target = '', voice-port = '3/1/1',  
    supported-language = '
```

The same should also be performed on R4:

```
R4#show dialplan number 916785551234# | i Macro|Voice|Type|type  
Macro Exp.: 916785551234  
VoiceOverIpPeer2  
    peer type = voice, information type = voice,  
    numbering Type = 'unknown'
```

```
type = voip, session-target = 'ipv4:150.1.1.2',
RTP dynamic payload type values: NTE = 101
RTP comfort noise payload type = 19
Max Redirects = 1, signaling-type = cas,
```

R4#

R4#**show dialplan number 9011441234567890# | i Macro|Voice|Type|type**

Macro Exp.: 9011441234567890

VoiceOverIpPeer2

```
peer type = voice, information type = voice,
numbering Type = 'unknown'
type = voip, session-target = 'ipv4:150.1.1.2',
RTP dynamic payload type values: NTE = 101
RTP comfort noise payload type = 19
Max Redirects = 1, signaling-type = cas,
```

Next, call a local or long distance number from R4. If you do not have physical access to the telephone connected to R4, use the **csim start** command. The output of the **debug voice ccapi inout** command during a local or long distance call from R4 to R2 shows the following:

R2#**debug voice ccapi inout**

voip ccapi inout debugging is on

R2#

*Mar 1 02:15:22.955: //-1/47BE158C8014/CCAPI/cc_api_display_ie_subfields:

cc_api_call_setup_ind_common:

cisco-username=2222

----- ccCallInfo IE subfields -----

cisco-ani=2222

cisco-anitype=0

cisco-aniplan=0

cisco-anipi=0

cisco-anisi=0

dest=916785551234

cisco-desttype=0

cisco-destplan=0

cisco-rdie=FFFFFFF

cisco-rdn=

cisco-rdntype=0

cisco-rdnplan=0

cisco-rdnpi=0

cisco-rdnsi=0

cisco-redirectreason=-1

*Mar 1 02:15:22.959: //-1/47BE158C8014/CCAPI/cc_api_call_setup_ind_common:

Interface=0x647FD408, Call Info(

Calling Number=2222(TON=Unknown, NPI=Unknown, Screening=Not Screened,
Presentation=Allowed),

Called Number=916785551234(TON=Unknown, NPI=Unknown),

Calling Translated=FALSE, Subscriber Type Str=Unknown, FinalDestinationFlag=TRUE,

Incoming Dial-peer=3, Progress Indication=NULL(0), Calling IE Present=TRUE,

-[Truncated Output]-

*Mar 1 02:15:22.983: //28/47BE158C8014/CCAPI/ccCallSetupRequest:

Destination=, Calling IE Present=TRUE, Mode=0,

Outgoing Dial-peer=1, Params=0x64F4DE34, Progress Indication=NULL(0)

-[Truncated Output]-

*Mar 1 02:15:22.987: //28/47BE158C8014/CCAPI/ccCallSetupRequest:

Destination Pattern=91....., Called Number=916785551234, Digit Strip=TRUE

-[Truncated Output]-

The output of the **debug voice ccapi inout** command during an international call from R4 to R2 shows the following:

R2#**debug voice ccapi inout**

voip ccapi inout debugging is on

R2#

*Mar 1 02:20:14.099: //30/xxxxxxxxxxxx/CCAPI/cc_api_caps_ind:

Call Entry Is Not Found

*Mar 1 02:20:14.103: //-1/EF1B8B2A801B/CCAPI/cc_api_display_ie_subfields:

cc_api_call_setup_ind_common:

cisco-username=2222

----- ccCallInfo IE subfields -----

cisco-ani=2222

cisco-anitype=0

cisco-aniplan=0

cisco-anipi=0

cisco-anisi=0

dest=9011441234567890

cisco-desttype=0

cisco-destplan=0

cisco-rdie=FFFFFFF

cisco-rdn=

cisco-rdntype=0

cisco-rdnplan=0

cisco-rdnpi=0

cisco-rdnsi=0

cisco-redirectreason=-1

*Mar 1 02:20:14.107: //-1/EF1B8B2A801B/CCAPI/cc_api_call_setup_ind_common:

Interface=0x647FD408, Call Info(

Calling Number=2222(TON=Unknown, NPI=Unknown, Screening=Not Screened,

Presentation=Allowed),

Called Number=9011441234567890(TON=Unknown, NPI=Unknown),

Calling Translated=FALSE, Subscriber Type Str=Unknown, FinalDestinationFlag=TRUE,

Incoming Dial-peer=3, Progress Indication=NULL(0), Calling IE Present=TRUE,

-[Truncated Output]-

*Mar 1 02:20:14.131: //30/EF1B8B2A801B/CCAPI/ccCallSetupRequest:

Destination=, Calling IE Present=TRUE, Mode=0,

Outgoing Dial-peer=2, Params=0x64F559F4, Progress Indication=NULL(0)

-[Truncated Output]-

*Mar 1 02:20:14.131: //30/EF1B8B2A801B/CCAPI/ccCallSetupRequest:

Destination Pattern=9011T, Called Number=9011441234567890, Digit Strip=TRUE

-[Truncated Output]-

Final Relevant Configuration R2:

R2#**show running-config**

Building configuration...

Current configuration : 1515 bytes

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname R2

!

!

!

!

interface Serial0/0

description .Connected To R4 Serial 0/1.

ip address 150.1.1.2 255.255.255.0

no fair-queue

!

```

!
!
!
voice-port 3/0/0
!
voice-port 3/0/1
!
voice-port 3/1/0
!
voice-port 3/1/1
!
!
!
!
!
dial-peer voice 1 pots
 destination-pattern 91.....
 port 3/1/0
 prefix 1
!
dial-peer voice 2 pots
 destination-pattern 9011T
 port 3/1/1
 prefix 011
!
dial-peer voice 3 voip
 destination-pattern 2222
 session protocol sipv2
 session target ipv4:150.1.1.4

```

Final Relevant Configuration R4:

R4#**show running-config**

Building configuration...

Current configuration : 1414 bytes

```

!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R4
!
!
!
!
interface Serial0/0
 description .Connected To R1 Serial 0/0.
 ip address 150.2.2.4 255.255.255.0
 clock rate 800000
 no fair-queue
!
!
!
!
voice-port 3/0/0
!
voice-port 3/0/1
!
voice-port 3/1/0
!
voice-port 3/1/1
!
!
!
!

```

```
:  
dial-peer voice 1 pots  
destination-pattern 2222  
port 3/0/0  
!  
dial-peer voice 2 voip  
destination-pattern 9T  
session protocol sipv2  
session target ipv4:150.1.1.2
```



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